Armed Forces College of Medicine

AFCM

(**Anatomy**)

Blood Supply of Spinal Cord& lesions affecting it

By Professor

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ILOs

- Describe the blood supply of spinal cord and predict effects of lesions affecting it

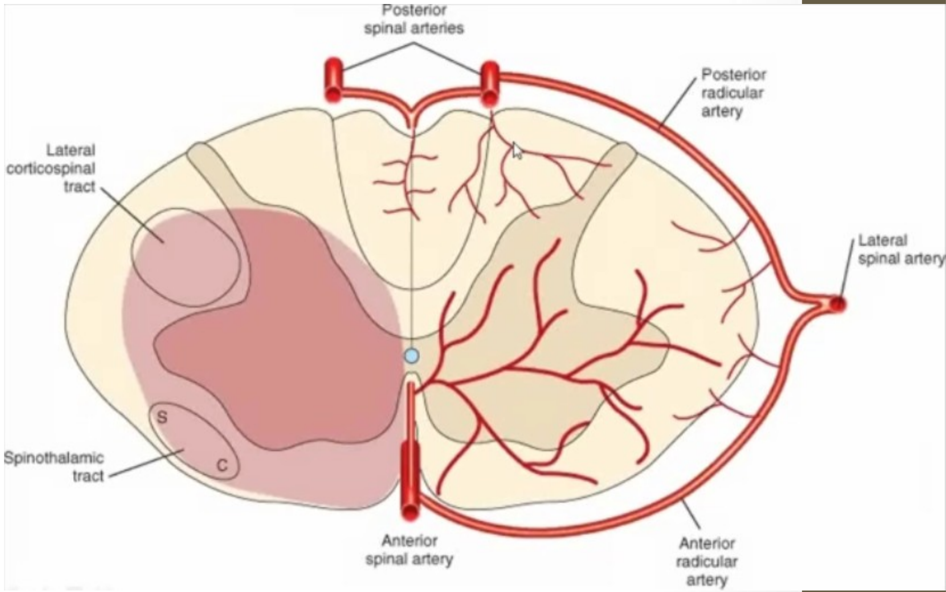
Arterial Blood Supply

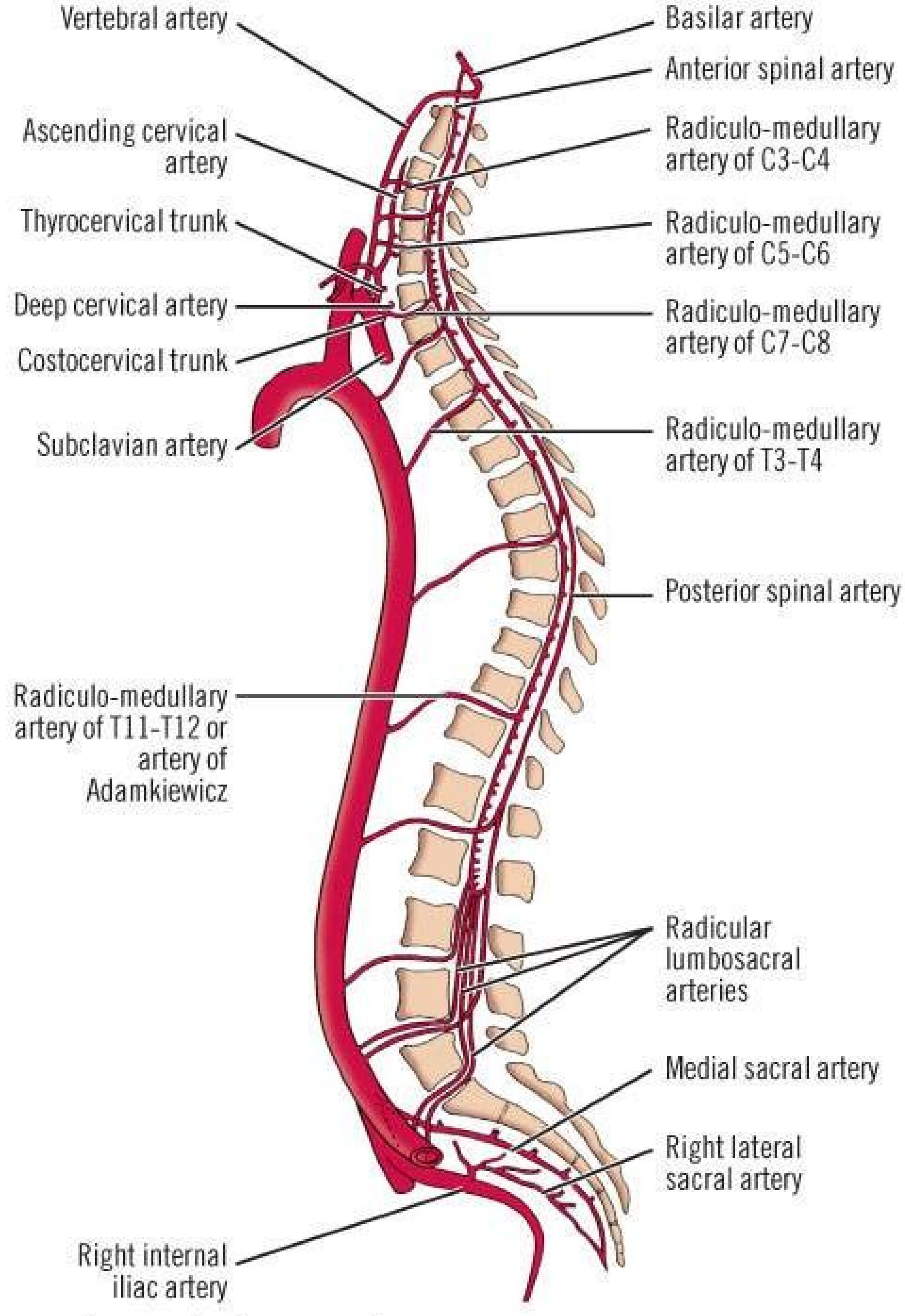
Spinal cord is supplied by

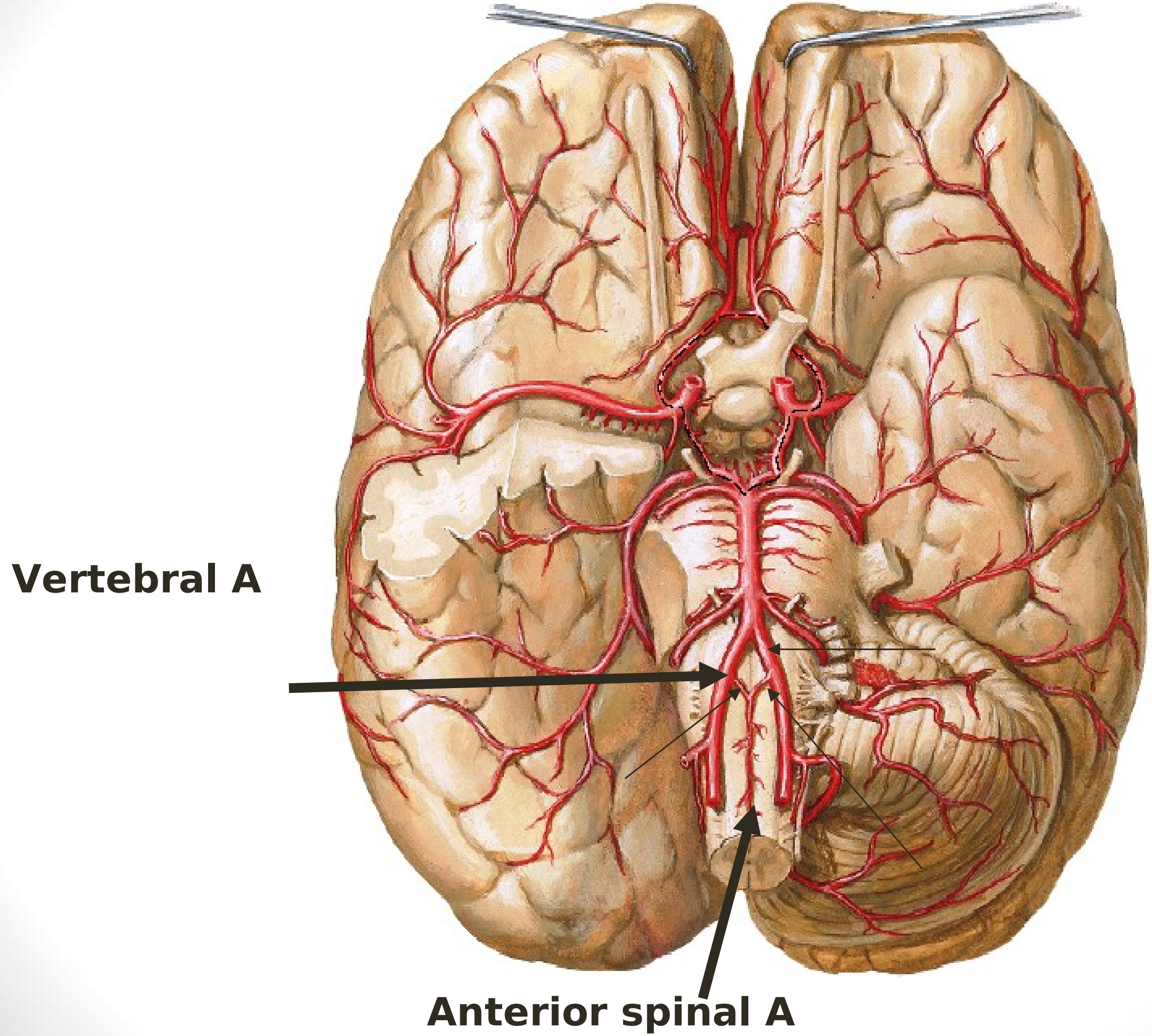
1- **Anterior spinal artery**

2- Posterior spinal artery

3- Radicular arteries

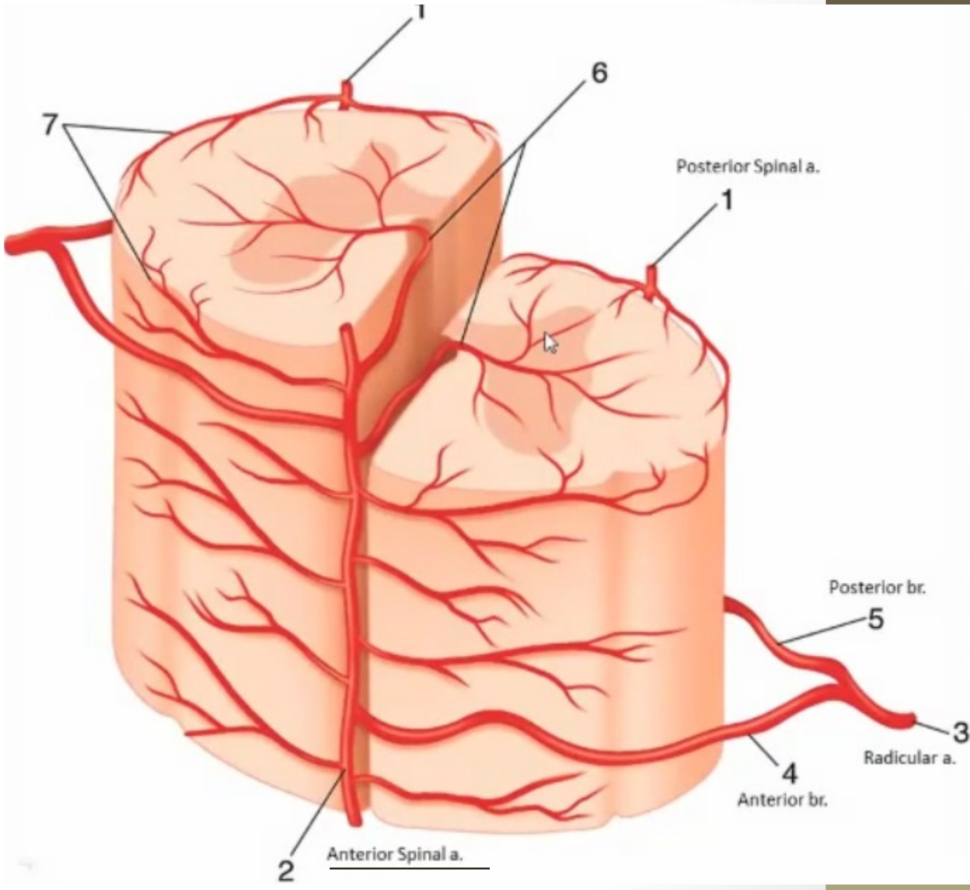



Vertebral artery
Ascending cervical artery
Thyrocervical trunk
Deep cervical artery
Costocervical trunk
Subclavian artery
Radiculo-medullary artery of T11-T12 or artery of Adamkiewicz
Right internal iliac artery
Basilar artery
Anterior spinal artery
Radiculo-medullary artery of C3-C4
Radiculo-medullary artery of C5-C6
Radiculo-medullary artery of C7-C8
Radiculo-medullary artery of T3-T4
Posterior spinal artery
Radicular lumbosacral arteries
Medial sacral artery
Right lateral sacral artery

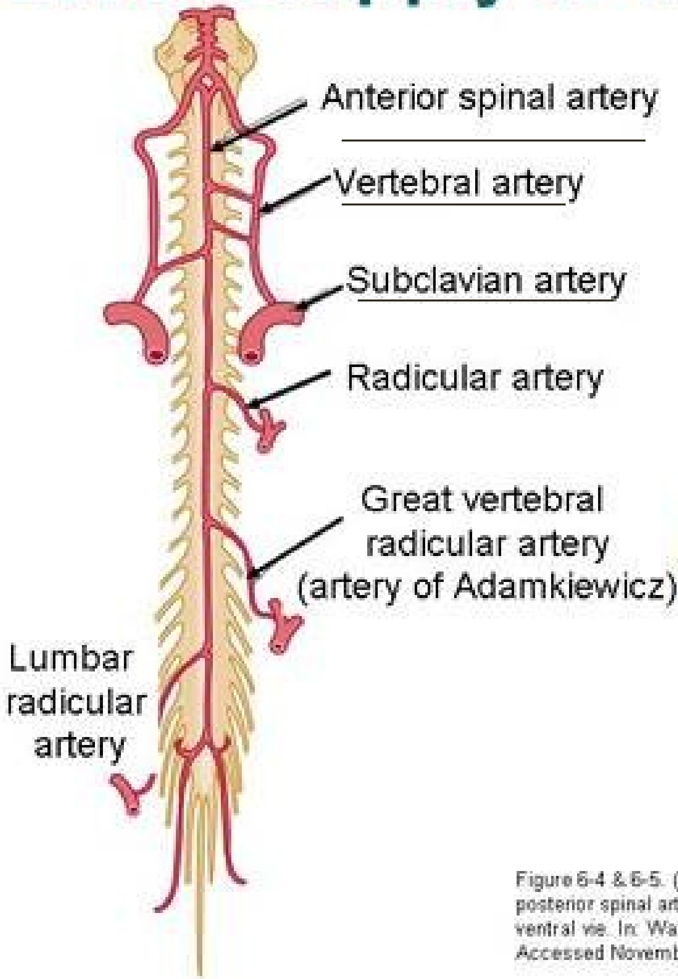

Vertebral A
Anterior spinal A

Anterior Spinal Artery

- 2 anterior spinal unite to form a single artery
- Each is a branch of vertebral artery inside the skull
- It descends through foramen magnum & runs in the anterior median fissure



Blood Supply to the Spinal Cord



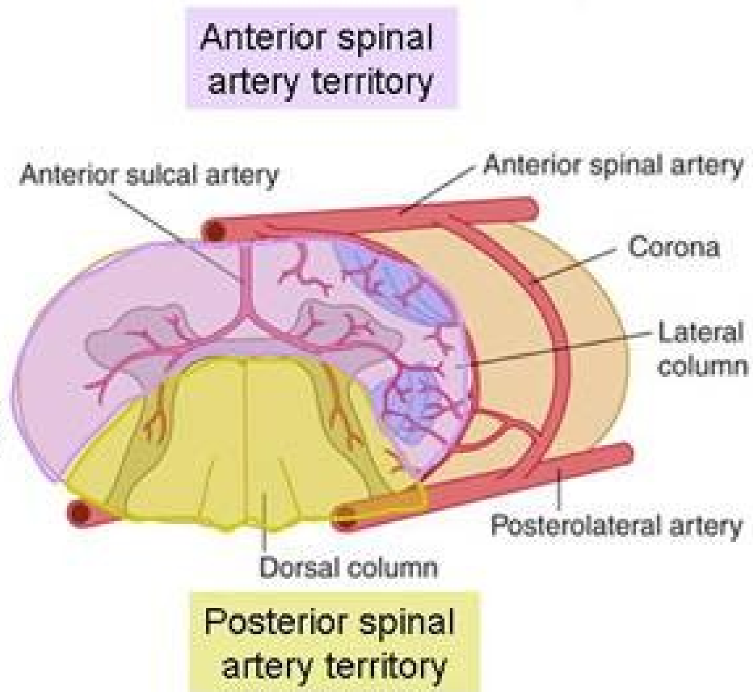


Figure 6-4 & 6-5. (4) Cross-section of the cervical spinal cord. The diagram shows the anterior and posterior spinal arteries with their branches and territories. (5) Vascularization of the spinal cord ventral vie. In: Waxman SG. *Clinical Neuroanatomy*. 26th ed. http://www.accessmedicine.com. Accessed November 2, 2009.

Distribution of Anterior Spinal

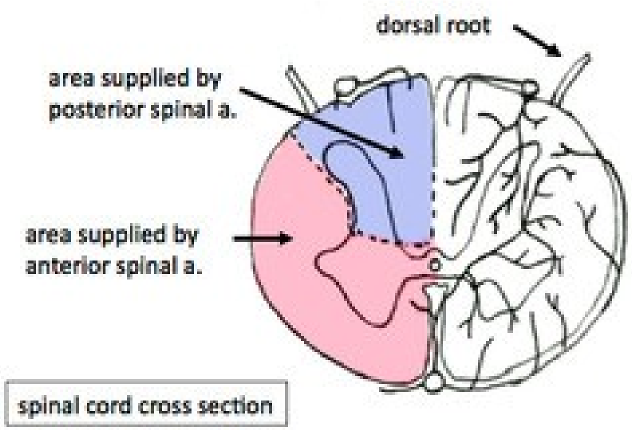
It supplies

1-Medial part of medulla

2- Anterior 2/3 of spinal cord

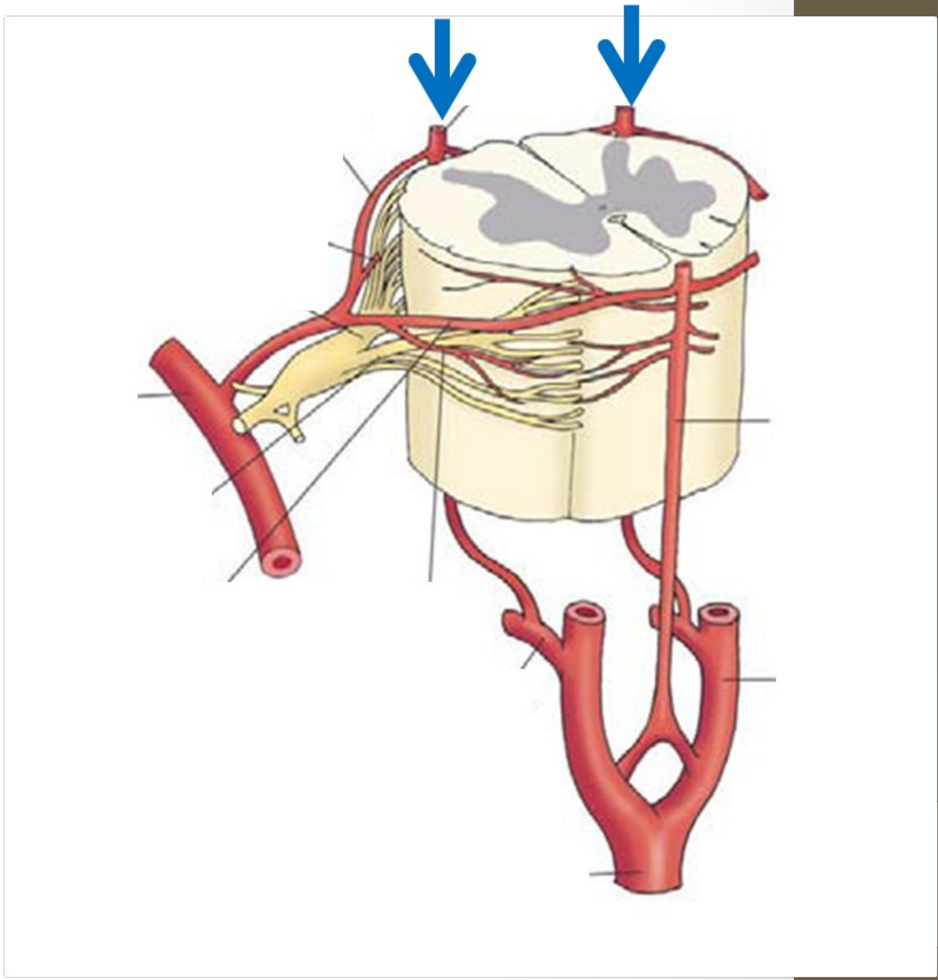
- anterior and lateral white columns
- ventral and lateral horns & base of dorsal horn

Remember: anterior spinal artery may be small in upper & lower thoracic segments



Posterior Spinal Artery

- It arises from vertebral or more common from posterior inferior cerebellar artery
- Descends in foramen magnum
- Runs across posterolateral sulcus
- Divides into 2 branches one anterior & other posterior to dorsal root of spinal nerve

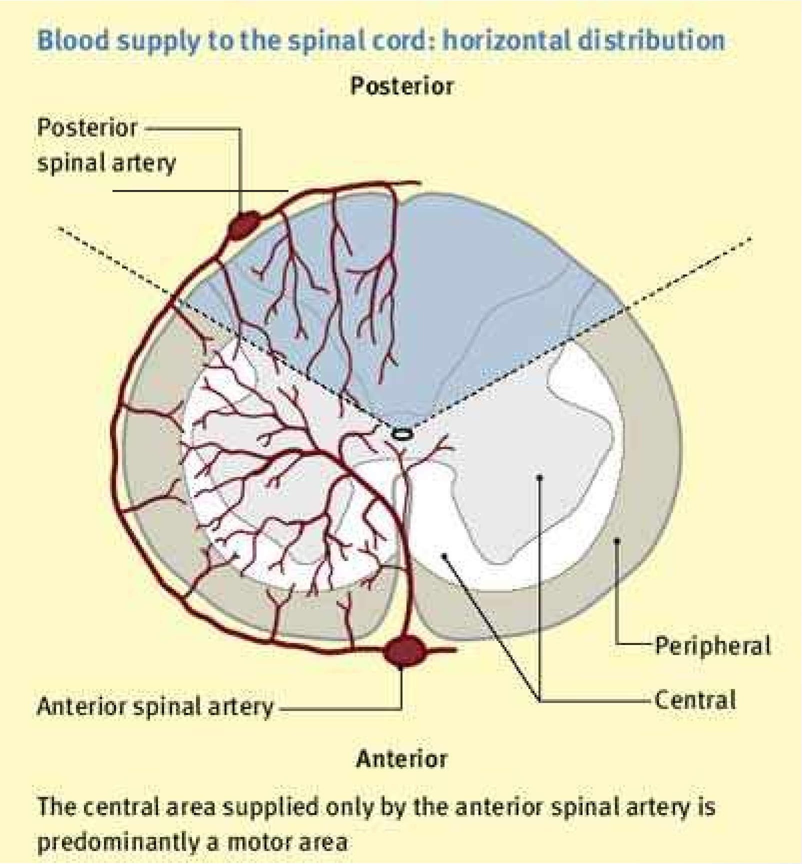


Distribution of Posterior Spinal

Posterior1/3 of spinal cord which means

- posterior white column
- posterior horn

Remember: posterior spinal arteries are small in upper thoracic segments



Segmental or Radicular Arteries

Arise from arteries o
vertebral column

1- Vertebral

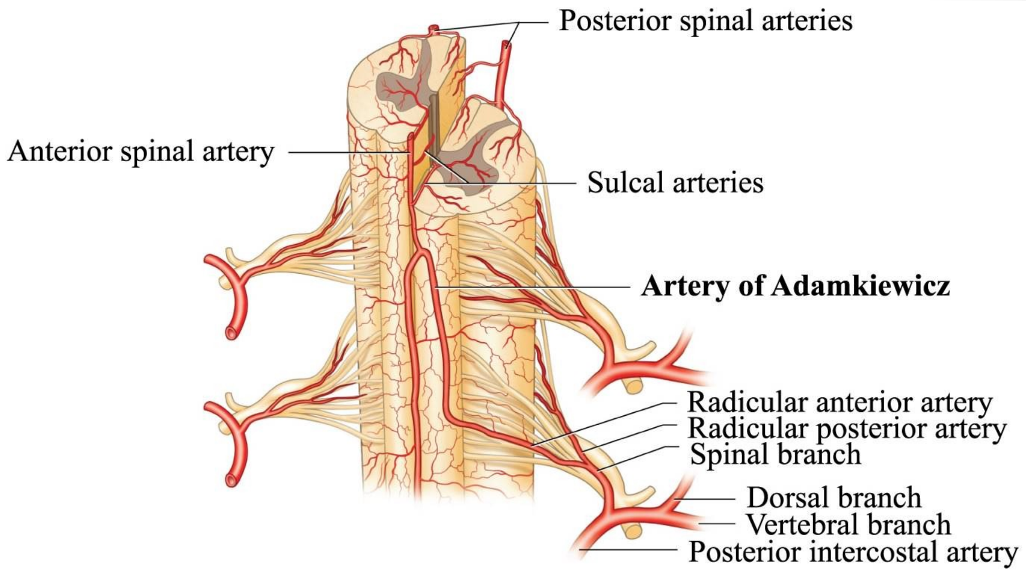
2- Ascending cervica

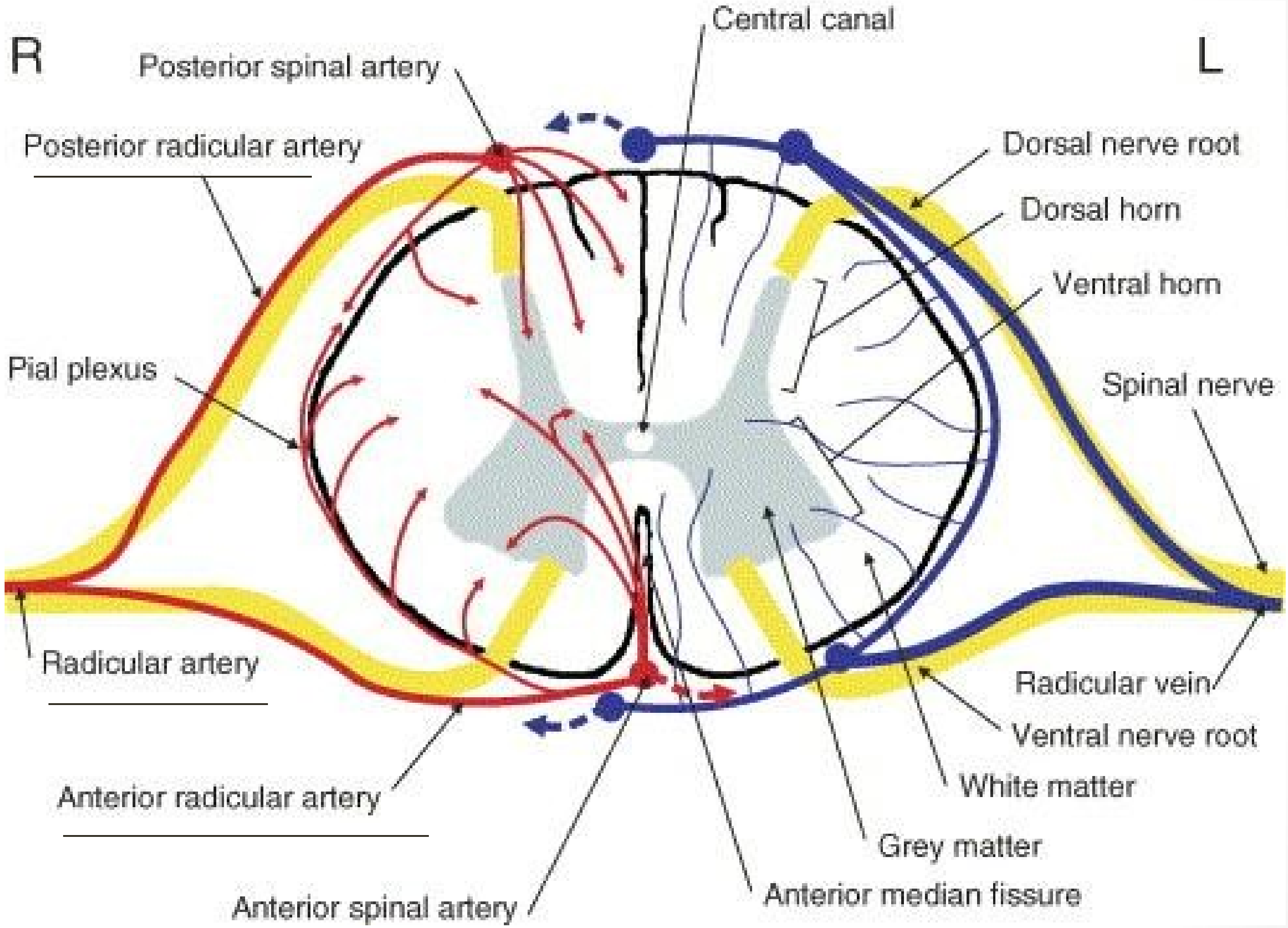
3- Posterior inter-co:

4- First lumbar

Course

- Passes through
intervertebral foran
- Gives anterior & pc
radicular branches that pass along dorsal & ventral roots
- Forms anastomosis with anterior & posterior spinal
- Supply periphery of cord



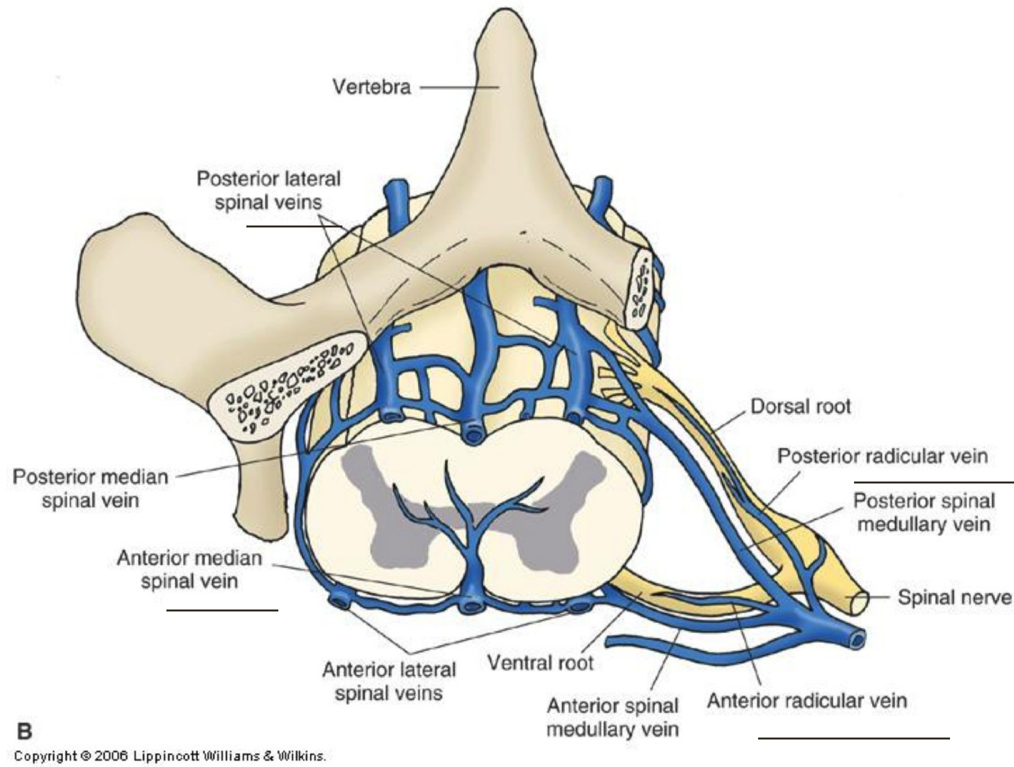

R
L
Central canal
Posterior spinal artery
Posterior radicular artery
Dorsal nerve root
Dorsal horn
Ventral horn
Pial plexus
Spinal nerve
Radicular artery
Radicular vein
Ventral nerve root
White matter
Anterior radicular artery
Grey matter
Anterior spinal artery
Anterior median fissure

Blood Supply of Cord

- Largest radicular (feeder artery) arises from 11 intercostal artery called Adamkiewicz artery (unilateral) supplies lower 2/3 of spinal cord
- lower part of cord depends on radicular artery
- **Cervical** :part depends on anterior & posterior spinal arteries
- **Mid thoracic:** is liable to **ischemia**
- **Lumbar** **:** has the **richest** blood supply

Venous Drainage: 6 longitudinal veins

- **Anterior median vein**: along anterior median fissure
- **Posterior median vein**: along posterior median sulcus
- **Four veins** along ventral& dorsal roots
- Veins drain into <u>internal vertebral venous plexus</u> & communicate with intervertebral veins
- Near base of skull longitudinal veins communicate with cerebellar veins & venous sinuses



Spinal Cord lesions

Complete transverse section

- Above C5 ………. Death due to paralysis of diaphragm & intercostal muscles
- Between C5 & T1 ………. Quadriplegia
- Below T1………………..Paraplegia

Hemi-section of Spinal Cord

- **Brown sequard syndrome**

At level of lesion;

1-Ipsilateral loss of all sensations(damage of dorsal root)

2-Ipsilateral LMNL(damage of anterior horn)

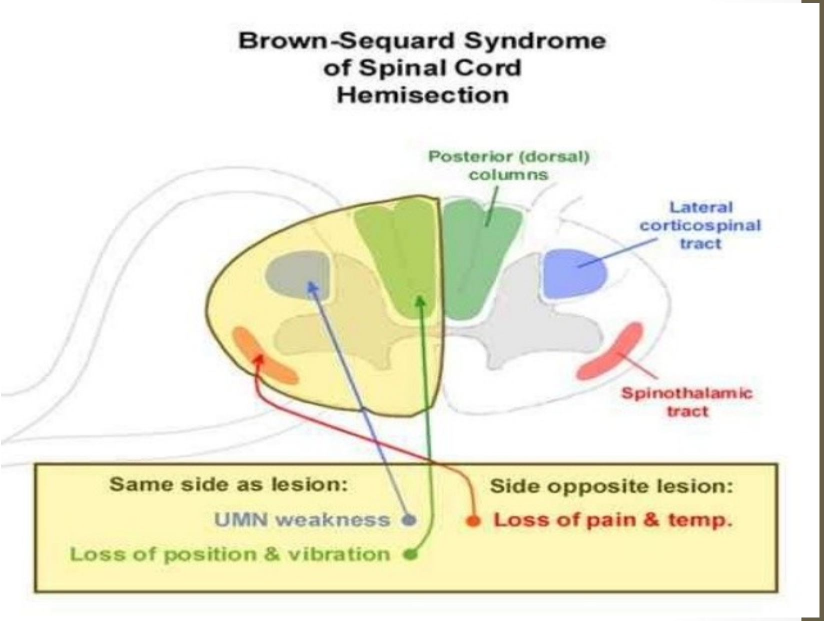
Below level of lesion ipsilateral:

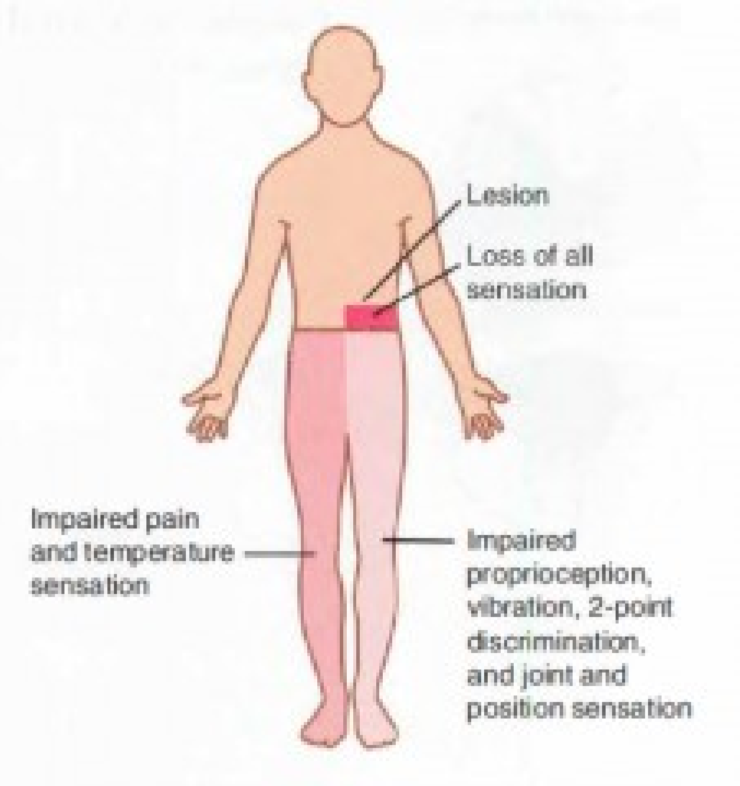
1- loss of proprioceptive sensations due to destruction of post white column

2- UMNL: due to affection of lateral corticospinal

Below level of lesion contra lateral

1- loss of pain and temperature due to affection of lateral spinothalamic

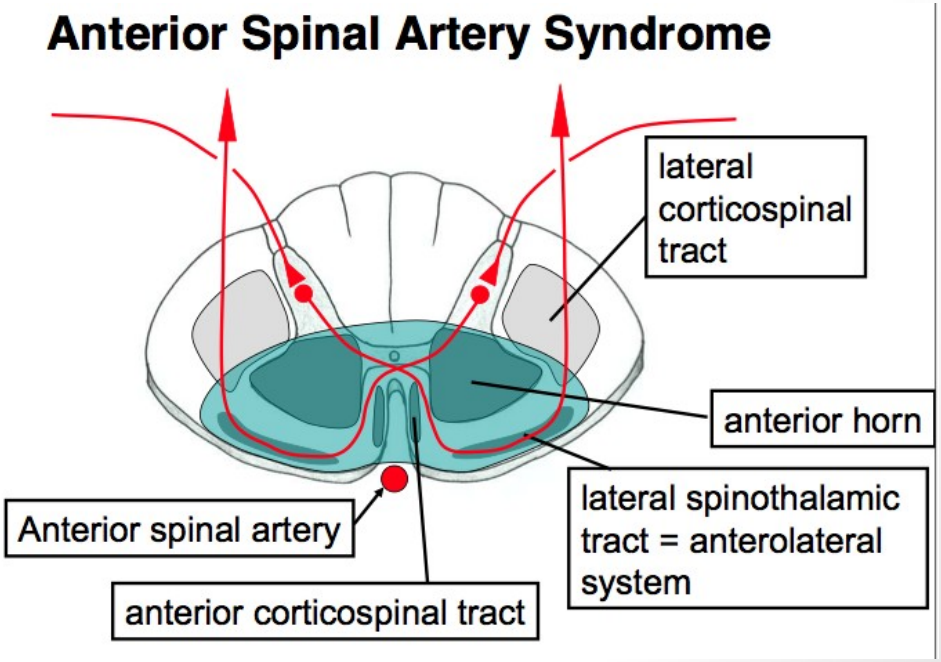




Lesion
Loss of all
sensation
Impaired pain
and temperature
sensation
Impaired
proprioception,
vibration, 2-point
discrimination,
and joint and
position sensation

Anterior spinal artery occlusion

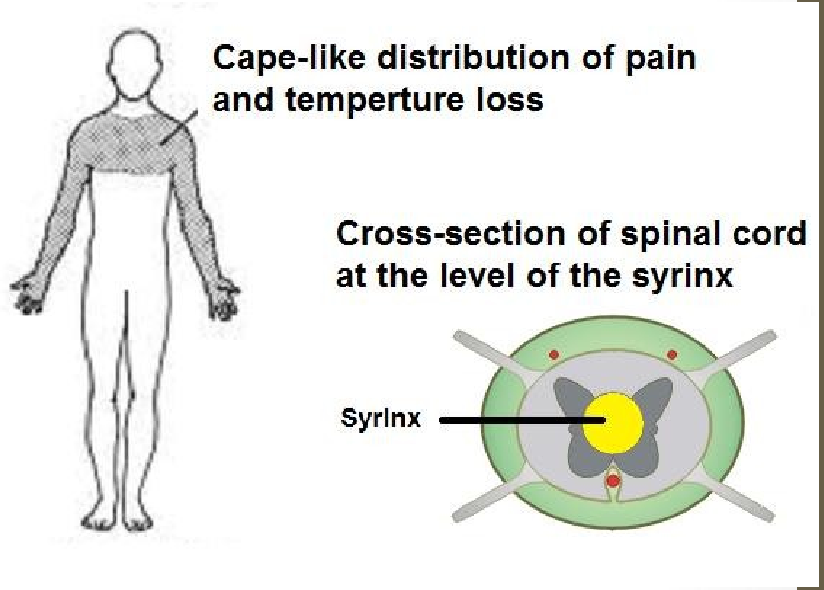
- Bilateral UMNL paralysis below the region
- Bilateral loss of pain and temperature below lesion
- Preservation of proprioception and touch



Selective Lesions

Syringomyelia

- Cavitation around central canal in cervical & upper thoracic segments
- Degeneration of crossing fibers of pain & temperature….. Bilateral loss of pain and temperature in dermatomes corresponding to levels affected (jacket distribution of anesthesia)



Tabes Dorsalis

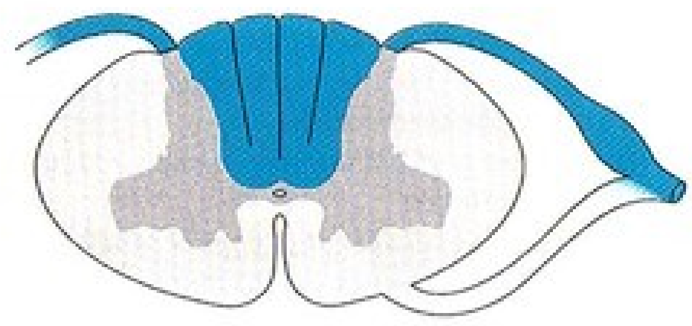
- **Syphilis destroys nerve fibers of dorsal root of spinal nerves at point of entrance**
- **Irritation of pain fibers …. Severe pain in dermatomes supplied by affected dorsal roots**
- **Degeneration of nerve fibers lead to**

1- loss of deep sensation

2- loss of proprioception

3- loss of tendon reflexes due to degeneration of afferent component of reflex arc

4-hypotonia of muscles due to loss of proprioceptive information from muscles



Poliomyelitis

Virus affecting lower motor neurons

- **Spinal type**: affect anterior horn cells leads to LMNL , it *affects lower limbs more & respiratory muscles may be affected*
- **Bulbar type**: affect cranial nerve motor nuclei leading to LMNL

Questions



- Anterior spinal artery is a branch of….
- Part of spinal cord liable to ischemia……
- A lesion characterized by jacket anesthesia
- In hemisection of spinal cord what happens below lesion……..
- What are possible causes of hemisection??????????????


THANK YOU!
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